

STATE OF VERMONT
PUBLIC SERVICE BOARD

Joint Petition of Green Mountain Power)
Corporation, Vermont Electric Cooperative, Inc.)
and Vermont Electric Power Company, Inc. for a)
Certificate of Public Good pursuant to 30 V.S.A. §)
248, to construct up to a 63 MW wind electric)
generation facility and associated facilities on)
Lowell Mountain in Lowell, Vermont and the)
installation or upgrade of approximately 16.9 miles)
of transmission line and associated substations in)
Lowell, Westfield and Jay, Vermont)

Docket No. ____

PREFILED TESTIMONY OF
JEFFREY A. NELSON
ON BEHALF OF GREEN MOUNTAIN POWER CORPORATION

May 21, 2010

Summary of Testimony

Mr. Nelson sponsors a report titled, *Kingdom Community Wind Project: Section 248 Natural Resources Assessment Report*. This report presents the results of the natural resource assessments conducted for the Kingdom Community Wind Project. Based on these assessments, Mr. Nelson's testimony addresses the potential impacts on water quality and the natural environment pursuant to 30 V.S.A. § 248(b)(5), which provides for due consideration to be given to the statutory (so-called "Act 250") criteria including: water/air /headwaters (10 V.S.A. § 6086(a)(1)(A)); waste disposal (10 V.S.A. § 6086(a)(1)(B)); water conservation (10 V.S.A. § 6086(a)(1)(C)); floodways (10 V.S.A. § 6086(a)(1)(D)); streams (10 V.S.A. § 6086(a)(1)(E)); shorelines (10 V.S.A. § 6086(a)(1)(F)); wetlands (10 V.S.A. § 6086(a)(1)(G)); water supply (10 V.S.A. § 6086(a)(2) and (3)); soil erosion (10 V.S.A. § 6086(a)(4)); rare and irreplaceable natural areas (10 V.S.A. § 6086(a)(8)); endangered species (plants) (10 V.S.A. § 6086(a)(8)(A)); and outstanding resource waters (10 V.S.A. § 1424a(d) & 30 V.S.A. § 248(b)(8)). He concludes that the Project will not result in any undue adverse impact under any of the criteria he addresses, provided certain practices are followed during construction.

PREFILED TESTIMONY OF JEFFREY A. NELSON
ON BEHALF OF
GREEN MOUNTAIN POWER CORPORATION

1 **1. Q. Please state your name and business address.**

2 **A.** My name is Jeffrey A. Nelson, and my affiliation and business address is Vanasse
3 Hangen Brustlin, Inc., 7056 US Route 7, North Ferrisburgh, Vermont.

5 **2. Q. By whom are you employed and in what position?**

6 **A.** I am employed by Vanasse Hangen Brustlin, Inc., d/b/a VHB Pioneer (“VHBP”),
7 as the Vermont Office Manager and Director of Environmental Services. My full resumé is
8 provided as **Exh. Pet.-JAN-1**.

10 **3. Q. Please describe your background and qualifications.**

11 **A.** I have worked as a consulting hydrologist and hydrogeologist in Vermont since
12 1982. I have a Bachelor of Science degree in Geology and a Master of Science degree in Civil
13 Engineering, both from the University of Vermont. My educational training includes extensive
14 scientific coursework, with a specialization on surface water hydrology and groundwater
15 hydrogeology. My professional background includes the direction, completion, and presentation
16 of technical studies, evaluation and review of scientific data pertaining to water resources,
17 determination of compliance with various State and Federal regulatory requirements, and
18 application for various permits and authorizations.

1 I have presented the results of such analyses and testified before all nine Vermont District
2 Environmental Commissions, the former Environmental Board, the former Vermont Water
3 Resources Board, the Vermont Public Service Board, the Vermont Environmental Court,
4 Regional Planning and Development Commissions, several Legislative Committees, and
5 numerous town boards.

6
7 I have actively participated in numerous technical stakeholders processes in Vermont, over many
8 years. Within the past several years, I was very involved in a docket with the Vermont Water
9 Resources Board exploring and seeking consensus on complex stormwater issues and have also
10 testified before several Committees of the Vermont General Assembly on various water-related
11 issues, including the stormwater legislation enacted in 2004. More recently, I was appointed by
12 the Vermont Water Resources Panel of the Natural Resources Board to participate in the
13 Wetlands Investigation Group, a broad representative group of stakeholders charged with
14 reviewing and recommending changes to the Vermont Wetland Rules to ensure protection of
15 significant wetlands in Vermont, while also enabling a more efficient review and permitting
16 process. This process led to a consensus proposal for legislative changes, rule revisions, and
17 map updates which have been embraced by a broad group of stakeholders and is anticipated to be
18 implemented during 2010.

1 **4. Q. Have you ever presented testimony to the Public Service Board**

2 **(“Board”) before?**

3 **A.** Yes, I have provided testimony to the Board previously in several different
4 proceedings, including petitions for Certificate of Public Good (“CPG”) on behalf of UPC
5 Vermont Wind, LLC in Docket 7156, and provided prefiled testimony on behalf of the Vermont
6 Electric Power Company, Inc. (“VELCO”) and Green Mountain Power Corporation (“GMP”) in
7 Docket 7314 (East Avenue Loop).

8
9 **5. Q.** Do you hold any professional licenses or certifications?

10 **A.** Yes. I am a *Certified Professional in Erosion and Sediment Control (CPESC)*
11 and a *Certified Professional in Storm Water Quality (CPSWQ)*.

12
13 **6. Q.** **What is the purpose of your testimony?**

14 **A.** The purpose of my testimony is (i) to address whether the Kingdom Community
15 (“KCW”) Project (the “Project”) complies with the environmental criteria under Section 248 and
16 (ii) to sponsor a report titled, “Kingdom Community Wind Project: Section 248 Natural
17 Resources Assessment Report”. This report is included with this filing as **Exh. Pet.-JAN-2**. At
18 certain times in the testimony I will refer to the turbines and associated components of the
19 Project as the “Wind Farm” components. I will also refer to the transmissions lines and
20 associated components as the “Transmission” components. I refer to GMP, Vermont Electric
21 Cooperative, Inc. (“VEC”) and Vermont Electric Power Company, Inc. collectively as
22 “Petitioners.”

I rely on Mr. Pughe's description of the various components of the Project, including locations of proposed turbine sites and access routes, and Mr. Jewkes' description of the proposed engineering design of the Project roads and crane paths, the manner of transporting equipment to the turbine sites, and the associated impacts relating to the criteria I address. Among other things, I have relied upon the project plan sets for the proposed 21 Vestas and 20 GE turbine arrays sponsored by Mr. Jewkes. I am applying the same process of turbine siting optimization, consideration of protection of natural resources through avoidance, minimization, and provision of buffers to this layout. Based on the work performed to date, I am confident that the degree of impact to environmental resources as described in my testimony that follows would be comparable to that associated with the 21 turbine array.

As the basis for our assessments, my staff and I conducted extensive surveys, field measurements, and observations on and in the vicinity of the Project site during the 2009 growing season, resulting in the collection of substantial environmental data sets.

7. Q. Please address the environmental criteria under Section 248.

A. What follows is a listing of each of the § 248(b) criteria I address with a description in each numbered paragraph of how the Project complies with the criteria specified.

**Aesthetics, Historical Sites, Air and Water Purity,
the Natural Environment, and Public Health and Safety**

[30 V.S.A. §248(b)(5)]

The Project will not have an undue adverse impact on air and water purity, the natural environment and the public health and safety, with due consideration having been given to the specific criteria specified in 10 V.S.A. § 1424a(d) and § 6086(a)(1) through (8) and (9)(K), as discussed in detail below.

Outstanding Resource Waters

[10 V.S.A. §1424a(d)]

Section 1-03(D) of the Vermont Water Quality Standards (VWQS) (effective January 1, 2008) provides that the Water Resources Panel (WRP) may, under 10 V.S.A. §1424(a), designate Outstanding Resource Waters. A list of these waters is maintained on the Natural Resources Board Water Resources Panel website. The following waterways have been classified by the WRP as Outstanding Resource Waters:

1. Batten Kill River, Towns of East Dorset and Arlington
2. Pike's Falls/Ball Mountain, Town of Jamaica
3. Poultney River, Towns of Poultney and Fair Haven
4. Great Falls, Ompompanoosuc River, Town of Thetford.

There are no waters in the Project vicinity that have been designated as outstanding resource waters and therefore the Project will not result in an undue adverse impact under this criterion.

Water and Air Pollution

[10 V.S.A. §6086(a)(1)]

The Project will not result in undue air pollution. No air emissions will occur during the operational phase of the Project. During the construction phase, to control construction dust, Erosion Prevention and Sediment Control (EPSC) activities will include mulching, temporary and permanent plantings, application of erosion control blankets, and limiting the amount of land area disturbed at one time. Also, during construction of the Project, vehicle emissions will primarily occur locally, intermittently, and at low levels. These increases will be controlled by measures required by state rules (e.g., vehicular emissions control) and are not expected to result in appreciable degradation of air quality. Because emissions during the construction phase will be temporary and of relatively low level, no significant adverse short-term impacts to air quality are anticipated to result from construction of the proposed Project. During operation of the completed Project, vehicle usage in the area will be very low and emissions from operation of the facility will be minor.

Also, with respect to potential air emissions, VHBP investigated the underlying bedrock geology. This investigation indicates that the bedrock present at the KCW Wind Farm project site does not contain asbestos, and thus, the site bedrock poses no special health or environmental hazards associated with project blasting and construction disturbance. The bedrock at the KCW Wind Farm Project site consists of schist and phyllite metamorphic rock belonging to the Stowe Formation, which is unlike the asbestos-containing Ultramafic bedrock formations that are located within the Vermont Asbestos Group (VAG) Mine Site in Lowell and Eden, Vermont. (see Bedrock Geology Map, **Exh. Pet.-JAN-3.**)

1

2 With respect to the potential for undue water pollution, VHBP and Krebs & Lansing will develop
3 both construction and operational phase stormwater management plans to ensure the proper
4 management of stormwater runoff from the Project site prior to discharge to Waters of the State.

5 Appropriate permit authorizations will be obtained from the Vermont Department of
6 Environmental Conservation (“DEC”), as described in greater detail below.

7

8 Analysis of impacts to streams is presented below under Criterion 1(E) and impacts to Class one
9 and Class two wetlands are discussed under Criterion 1(G). With respect to Class Three
10 wetlands, which are not regulated under the Vermont Wetland Rules (VWR), nor considered
11 under Criterion 1(G), these features have been identified and delineated for both the Wind Farm
12 and transmission components, and are described in detail in the KCW Natural Resources Report
13 (**Exh. Pet.-JAN-2**). In assessing the protection of streams and riparian wetlands, VHBP used the
14 procedures associated with the Vermont Agency of Natural Resources (“ANR”) 2005 *Guidance*
15 *for Agency Act 250 and Section 248 Comments Regarding Riparian Buffers (Riparian Buffer*
16 *Guidance)*. Specifically, VHBP has used a riparian management plan approach has to quantify
17 existing buffer functions and to determine necessary buffer widths to protect these functions.
18 Following delineations of the stream and wetland features, VHBP conducted a function and
19 value assessment of each feature in order to generate a recommended buffer. The buffer width
20 assessment was prepared to specifically address the functions and values associated with the
21 delineated riparian wetlands and streams. VHBP developed the buffer width assessment to

conform to the *Riparian Buffer Guidance* as well as regulatory requirements associated with Class One and Class Two wetlands.

VHBP has provided the buffer analysis to the Project design team, which also includes Krebs & Lansing and GMP, for planning purposes to evaluate opportunities to maximize resource protection. Although all feasible efforts have been made to avoid buffer impacts and minimize stream crossings, at some locations, the recommended buffer widths will not be attainable, and in certain areas stream/wetland crossings will be necessary. In addition, achieving stated buffer widths as averages, through wider buffer zones where feasible and narrower widths where necessary.

Buffers for wetlands are based on the number of principal functions and values associated with each wetland feature. Functions and values for each wetland were assessed following guidance and parameters provided by the U.S. Army Corps of Engineers (USACE) in *The Highway Methodology Workbook Supplement: Wetland Functions and Values – A Descriptive Approach* (NAEEP-360-1-30a) (USACE, 1999). Other factors included in the buffer width recommendations include VWR classification, for which Class Two wetlands require a 50 foot buffer.

GMP has designed the Project to avoid impacts to Class Three wetlands and buffers wherever feasible. For those impacts that are unavoidable, all feasible efforts to minimize wetland and buffer impacts have been incorporated into the design. For the Wind Farm component, there would no impacts to Class Two wetlands or buffers, as these features are currently classified.

1 We have determined that a total of approximately .64 acres of direct impact to streams and Class
2 Three wetlands through fill or excavation will occur as a result of the 21 turbine layout.
3 Approximately 1.07 acres of secondary impact due to clearing of forested wetlands, which would
4 result in a change in the cover type, but not result in any dredging or filling of these features. For
5 the 20 turbine layout, the impact areas are comparable, at 0.59 acres direct and 1.07 acres
6 secondary impact. Therefore, the two alternative layouts do not represent a significant difference
7 insofar as impacts to water resource features, and in both cases the designs represent a successful
8 effort by the Project design team to avoid impacts and where impacts are unavoidable, to
9 minimize the amount of such impacts.

10
11 For the Transmission component, a very small amount of direct impact to Class Two and Three
12 wetlands are anticipated (less than 0.01 acres). Direct permanent impacts are only expected to
13 occur from unavoidable pole placement in wetlands. Secondary impacts due to clearing of
14 forested wetlands of less than 5 acres will occur due to widening of the cleared right-of-way
15 (ROW) to 100 feet. Within sensitive environmental resource areas, site-specific vegetation
16 management measures will be implemented to avoid impacts. Finally, there will be temporary
17 impacts due to construction phase access to pole placement sites, which have not yet been
18 quantified.

19
20 Given the design elements and avoidance as described above, the Project will not result in undue
21 water pollution, as also discussed in further detail below.

Headwaters

[10 V.S.A. §6086(a)(1)(A)]

VHBP analyzed available information to determine if the Project will be located on any lands that meet the criteria of 10 V.S.A. §6086 (a)(1)(A), which are incorporated in the Section 248 review, including:

- i) headwaters or watersheds characterized by steep slopes and shallow soils;
- or
- ii) drainage areas of 20 square mile or less; or
- iii) above 1,500 feet elevation; or
- iv) watersheds of public water supplies designated by the ANR; or
- v) areas supplying significant amounts of recharge waters to aquifers.

Within portions of the KCW Wind Farm component of the Project, there are areas of steep slopes and the drainage areas of several of the delineated features are less than 20 square miles. In addition, portions of the turbine access road and the turbine station locations themselves are located above 1,500 feet elevation. See **Exh. Pet.-JAN-4**.

Since Project components meet one or more of the headwaters criteria, the Project meets the definition of a headwaters area and must conform to applicable regulations including DEC Rules and the 2008 VWQS. Fundamentally, VHBP and Krebs & Lansing have seen a key objective of the project design as the necessity of maintaining the natural drainage patterns and topography within the site, insofar as practicable. We have achieved this objective by minimizing the amount of grading for road construction and turbine pad areas, maintaining natural surface water

flows associated with streams and wetlands crossed by the Project access road and crane path, and providing buffers to water resource features wherever possible. To further ensure conformance with this criterion, the design and construction of both Project components will incorporate measures to protect water quality during construction, by implementing a comprehensive EPSC Plan. To protect water quality and control runoff rates following construction, GMP will implement a permanent stormwater management plan in accordance with DEC permit authorizations. With respect to DEC permitting for the construction stormwater discharges associated with the Wind Farm component, VHBP anticipates that the Project will not qualify for coverage under existing construction phase General Permit 3-9020 (2006, Amended February 2008), and that a National Pollutant Discharge Elimination System (NPDES) Individual Discharge Permit will therefore be required for the Project. Separate construction phase Notices of Intent (NOI) for coverage under GP 3-9020 will be prepared for the transmission line and substation upgrade components of the Project. As a component of the EPSC Plan, particular attention will be given to those areas of earth disturbance that are located within close proximity to receiving waters that are situated above 2,500 feet in elevation. Associated with the Wind Farm component of the Project, VHBP anticipate that construction stormwater discharges will occur in the following Class A stream segments and wetlands: 2009-SC-15a, 2009-SC-15b, 2009-SC-C29, 2009-SC-C30, 2009-SC-C31, 2009-SC-33, and Wetland 2009-C23. The Vermont DEC Risk Evaluation associated with the NPDES Individual Discharge Permit application will address potential construction phase stormwater discharges to Class A Waters.

1 With respect to the operational phase of the project, the Wind Farm component will require
 2 permitting of discharges of stormwater runoff pursuant to 10 VSA § 1264. Based on the
 3 proposed use of modifications to standard design practices as described in the testimony of Ian
 4 Jewkes, the project will be required to obtain an Individual Discharge Permit. As a component
 5 of the operational phase stormwater discharge permit application, VHBP and Krebs & Lansing
 6 will prepare an operational phase stormwater management plan to demonstrate how the project's
 7 stormwater treatment and control design elements will meet water quality and water quantity
 8 requirements of the *Vermont Stormwater Management Manual* (VSMM, 2002) for the Wind
 9 Farm component of the Project. As part of plan development, the design of permanent
 10 stormwater treatment practices (STPs)¹ that will discharge to receiving water above 2,500 feet in
 11 elevation will reflect applicable requirements associated with Class A waters. Based on the
 12 proposed Project design, there is only one STP that will discharge treated and controlled
 13 stormwater runoff to receiving water above 2,500 feet: Pond #14 and Stream 2009-SC-C30.
 14 Finally, the plan will also include a monitoring study plan, which will be implemented by GMP
 15 in accordance with the requirements of Section 2.5.2 of VSMM to evaluate the performance of
 16 the STPs to be utilized for the Project.

17
 18 In addition, the Project will be operated under the provisions and protocols of the existing GMP
 19 Spill Prevention, Control and Countermeasures (SPCC) Plan, which has been modified to
 20 address specific elements of the Project. See **Exh. Pet.-JAN-5**. Consistent with the

1 Stormwater Treatment Practices or STPs consist of structural or nonstructural measures which provide for treatment and/or control of stormwater runoff from impervious surfaces. Examples include stormwater detention basins, grass swales, etc.

requirements of these stormwater permits and SPCC plans, water quality impacts will be minimized to the extent practicable and meet DEC regulations related to water quality protection. For these reasons, this Project will not have an undue adverse impact to headwaters.

Waste Disposal

[10 V.S.A. §6086(a)(1)(B)]

The Act 250 Waste Disposal criterion incorporated into Section 248 review provides that a project must meet applicable health and environmental conservation department regulations regarding the disposal of waste, and must not involve the injection of waste materials into groundwater or wells. Consideration of wastewater disposal involves both sanitary wastewater and stormwater runoff. With respect to sanitary wastewater, during construction of the Wind Farm component, portable toilets serviced by a licensed septic hauler will be used on the site. Once the Project is operational, the only sanitary wastewater to be generated will be associated with the maintenance building. Wastewater from the maintenance building will be disposed via a leach field disposal system. The treatment and disposal system will be designed, permitted, and constructed to meet the applicable criteria of the 2007 *Vermont Wastewater System and Potable Water Supply Rules* (VT ANR, DEC 2007) with respect to the siting and design of the wastewater facilities. Based on available information regarding soils from the Natural Resources Conservation Service (NRCS), and from soil test pits on the site, soil conditions at the KCW Wind Farm Project site are suitable for an on-site wastewater disposal system.

Pursuant to the *Vermont Environmental Protection Rules, Chapter 18, Stormwater Management Rule* (VT ANR, DEC 1994), permit coverage is required under the Vermont DEC General

Permit (GP) 3-9015² for new stormwater discharges to waters that are not principally impaired by collected stormwater runoff. Coverage under the General Permit is required for Project discharges of regulated stormwater runoff³ from new development, redevelopment, and/or expansion of existing development that results in at least one (1) acre of impervious surface to waters of the State.

As a component of the Operational phase stormwater discharge permit application process, a Project-specific operational-phase stormwater management plan involving a suite of permanent STPs, is being prepared, in compliance with the 2002 VSMM. Vermont DEC will ultimately review the plan as part of the GP 3-9015 review process. Pursuant to Vermont DEC GP 3-9015 and the VSMM, the stormwater management plan will meet the following applicable treatment standards, as described in further detail in Mr. Jewkes' testimony:

- Water Quality (WQ_v) – A storage volume to be provided via STPs per VSMM to capture stormwater runoff and allow for removal of sediment, as measured by total suspended solids (TSS) and nutrients, as measured by total phosphorus (TP) loads.
- Channel Protection (CP_v) – A storage volume to be provided via STPs per VSMM to reduce the potential for in-stream channel degradation.

² The Project will either seek coverage under GP 3-9015 or obtain an individual operational phase stormwater discharge permit (INDS).

³ Pursuant to the Vermont Environmental Protection Rules, Chapter 18, *Stormwater Management Rule*, “regulated stormwater runoff” is defined as “precipitation, snowmelt, and the material dissolved or suspended in precipitation and snowmelt that runs off impervious surfaces and discharges into surface waters or into groundwater via infiltration.”

- 1 • Groundwater Recharge (Re) – A volume of runoff to be infiltrated into native
- 2 materials to be provided via structural and/or non-structural practices per VSMM.
- 3 • Overbank Flood Protection (Q_{10}) – Control of post-development peak discharge
- 4 rates via STPs per VSMM to not exceed pre-development peak discharge rates
- 5 during the 10-year, 24-hour storm event to minimize potential of overbank
- 6 flooding from infrequent but large storm events (e.g., 10-year storm event).
- 7 • Extreme Flood Protection (Q_{100}) - Control of post-development peak discharge
- 8 rates via STPs per VSMM to not exceed pre-development peak discharge rates
- 9 during the 100-year, 24-hour storm event to minimize potential of flood damage
- 10 from infrequent but very large storm events (e.g., 100-year storm event).

11 To meet applicable treatment standards, the stormwater management plan will, in general,

12 contain STPs that are suitable for site conditions, in terms of function and constructability.

13 Specific required functions of the STPs will be determined as part of the hydrologic analysis that

14 will be conducted for the site and, in turn, serve as the basis for design. It is anticipated that the

15 stormwater management plan will involve certain alternative design practices, in combination

16 with structural and non-structural STPs, such as: stormwater ponds, level spreaders, sheetflow

17 across vegetated areas, and swales. As described by Mr. Jewkes, should it be determined that

18 any of the alternative designed systems do not perform in accordance with the treatment and

19 control performance criteria of the DEC Stormwater Rule, implementation of conventional

20 stormwater treatment practices could be reasonably completed at each of the STP locations

21 included in the current design. These features could be constructed without additional impacts to

1 natural resources features, and will ensure that proper levels of stormwater management are
2 provided from all areas within the Wind Farm component of the Project.

3
4 For these reasons, the Project meets applicable health and environmental conservation
5 department regulations regarding the disposal of waste, and does not involve the injection of
6 waste materials into groundwater or wells.

7
8 **Water Conservation**

9 [10 V.S.A. §6086(a)(1)(C)]

10
11 The Act 250 Water Conservation criterion (10 V.S.A. § 6086 (a)(1)(C)) incorporated into Section
12 248 review requires that a project's design incorporate water conservation principles. As
13 described previously, Project components involve very limited water usage. During
14 construction, small amounts of water usage may be necessary for dust suppression, in accordance
15 with the EPSC Plan, as well as for pressure washing of towers. Once operational, the only
16 ongoing water use will be potable water usage at the maintenance building within the KCW
17 Wind Farm component.

18
19 A drilled bedrock well will provide the necessary water supply. Water conserving fixtures will
20 be provided for fixtures used for this facility. Therefore, the Project will ensure that reasonable
21 efforts will be made to conserve water.

Floodways

[10 V.S.A. §6086(a)(1)(D)]

This criterion requires that there be no undue adverse impact on lands described as floodways.

The term “floodway” is defined in the criterion of Water Conservation (10 V.S.A. §6086

(a)(1)(D)) as incorporated into Section 248 review, to mean “the channel of a watercourse which

is expected to flood on an average of at least once every 100 years and the adjacent land areas

which are required to carry and discharge the flood of the watercourse...” The term “floodway

fringe” is defined in Section 6001(17) as “an area which is outside a floodway and is flooded

with an average frequency of once or more in each 100 years...” VHBP analyzed the available

Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map and determined

that there are no FEMA-mapped floodways within any region of the Wind Farm component of

the Project. The Transmission component crosses near several FEMA-mapped Zone A

floodways.⁴ In Lowell, Vermont, these include Zone A floodways associated with the East

Branch of the Missisquoi River, Ace Brook, Truland Branch Brook, an unnamed tributary to the

East Branch of the Missisquoi River, and LeClair Brook. In Westfield, Vermont, these include

the Missisquoi River, an unnamed tributary to the Missisquoi River, Taft Brook, an unnamed

tributary to Taft Brook, and Mill Brook. In Jay, Vermont, the corridor crosses Zone A

floodways associated with Jay Branch and Crook Brook. Although several floodways and

floodway fringes will likely be crossed by the chosen alignment, the Transmission component

does not involve development activities and there should be minimal to no alterations to

waterways, flood elevations, or the ability of the land to hold water as a result of existing

⁴ Zone A, or “Special Flood Hazard Areas”, are those inundated by the 100-year flood, as designated by FEMA.

overhead utility line upgrades or new installation along existing roadway ROWs. Substations associated with the transmission upgrade are located outside of FEMA Zone A designated areas and potential substation upgrades will not impact floodways. The FEMA maps for the Project components are contained in **Exh. Pet.-JAN-2** and Appendix 8 included therein. Based on the discussion above, there will be no undue adverse impact to lands that meet the floodway criteria under Section 6086(a)(1)(D).

Streams

[10 V.S.A. §6086(a)(1)(E)]

This criterion requires that projects located on or adjacent to streams will, whenever feasible, maintain the stream channel condition, or address whether the project will endanger the health, safety, or welfare of the public or adjoining landowners. To address this criterion, VHBP has conducted wetland and stream delineations at the locations of all the Project components including the Wind Farm, Transmission Connection, and Substation sites. See **Exh. Pet.-JAN-2**, Section 5.0 for additional details. The Wind Farm component of the Project is located along the Lowell Mountain ridgeline and Project lands are within the Vermont ANR River Basins 6 (Missisquoi Drainage Basin) and 17 (Lake Memphremagog Drainage Basin). The Missisquoi River watershed is to the west, ultimately draining to Lake Champlain, and the Black River is to the east, which drains to the South Bay of Lake Memphremagog. See **Exh. Pet.-JAN-4**. Numerous unnamed tributaries originate within or downslope of the Project area. To the west of the ridgeline, the named streams downstream of the Project area include the upper reaches of the East Branch of the Missisquoi River, Ace Brook, and Truland Brook. On the east side of the ridge, in a north to south progression, the down-gradient named streams include Seaver Branch,

1 Rogers Branch, Shalney Branch, McCleary Brook, and Lamphean Brook. The Transmission
2 component of the Project crosses land drained by several named and unnamed tributaries,
3 including the Missisquoi River. The Transmission component is located entirely within the
4 Missisquoi River watershed (Vermont ANR Basin 6).

5
6 Within the Wind Farm component, the delineated streams within the Project include both Class
7 A(1) and Class B waters as designated pursuant to the 2008 VWQS. Class A(1) waters are those
8 stream segments located along the Lowell Mountain ridgeline that are above 2,500 feet in
9 elevation above sea level. These include the upper reaches of VHBP delineated stream channels
10 2009-SC-C15a, 2009-SC-C15b, 2009-SC-C29, 2009-SC-C31, 2009-SC-C30, 2009-SC-C33, and
11 2009-SC-C57, as depicted on **Exh. Pet.-JAN-6**. The remaining waters are Class B. The specific
12 classifications of individual receiving waters at each point of discharge will be identified as a
13 component of construction and operational phase stormwater discharge permit applications.
14 These classifications will be considered in project stormwater designs.

15
16 Within the Transmission component, the delineated streams are predominantly Class B waters as
17 designated, pursuant to the 2008 VWQS. However, Class A(2) waters within the project area
18 include those stream segments within the watersheds of the Coburn Brook and Coburn Brook
19 Reservoir in Westfield, and upstream of the water intake on Coburn Brook. These include the
20 VHBP-delineated stream channels 2009-SC-C28b, 2009-TB-C29 (Coburn Brook), 2009-SC-
21 C30, and 2009-TB/SC-C31, as depicted on **Exh. Pet.-JAN-7**. VHBP will identify the specific
22 classifications of individual receiving waters at each point of discharge as a component of

1 construction phase stormwater discharge permit applications (no operational phase permit is
2 necessary for the Transmission component). These classifications will be considered in Project
3 stormwater designs.

4
5 The Project design team developed the Project plans so as to avoid impacts to streams where
6 feasible, and where not feasible, to minimize impacts to these resources. Several stream
7 channels will require permanent and temporary roadway crossings. For the Wind Farm
8 component, the majority of the stream crossings will be permanent, culverted crossings in order
9 to establish roadway infrastructure up to and along the ridgeline. In order to mitigate against
10 undue adverse impacts to streams for Wind Farm construction activities, the access road has
11 been located and designed to minimize stream and riparian zone impact. This has been
12 accomplished by using perpendicular crossing orientation and bottomless culverts, by
13 minimizing riparian zone vegetative clearing, by maximizing fill slopes where applicable, and by
14 minimizing road/culvert footprints. The resulting design will result in approximately one quarter
15 acre of permanent stream impact for the Wind Farm component.

16
17 For the Transmission component, temporary stream crossings are expected to be necessary for
18 construction phase access to sites of pole placement. These access points will be designed in
19 accordance with the 2006 Vermont Standards and Specifications for Erosion Prevention and
20 Sediment Control, which along with the comprehensive EPSC Plan for construction activities
21 will protect against secondary stream channel impacts from erosion and sedimentation. A
22 Department of the Army Section 404 Permit and a Vermont State Section 401 Water Quality

Certification will be required for the Project, and will also include review of stream crossing impacts. Therefore, the design and implementation measures taken, in combination with the review and conditional requirements included with the Section 404/401 permitting, will mitigate against any undue natural stream channel degradation, endangerment to the health, safety, or welfare of adjoining or downstream landowners.

VHBP has generated recommended stream buffers for each feature in the Wind Farm component, following an evaluative ranking of buffer functions and values specified in the *ANR Guidance for Agency Act 205 and Section 248 Comments Regarding Riparian Buffers*, December 9, 2005, under Appendix A. These functions and values include:

1. Protection of water quality
2. Protection of aquatic habitat
3. Protection of terrestrial habitat
4. Protection of channel, lakeshore, and floodplain stability
5. Maintenance of wetlands
6. Social and economic values of riparian corridors and buffer zones

VHBP has applied specific weights to the individual functions and values to more accurately generate a buffer recommendation that reflects ANR's priorities for riparian buffers, which are water quality protection, channel protection, and maintenance of wetlands. A rank from 0 to 3 is calculated for each function and value and, based on the ranking, a buffer width recommendation is generated. Buffer recommendations are included in the Project plans sponsored by Mr.

Jewkes. As a result of the avoidance of streams in the Project vicinity, the minimization of impacts, and the provision of buffer zones consistent with ANR guidance, the Project as designed will maintain the natural condition of streams to the degree feasible.

Shorelines

[10 V.S.A. § 6086(a)(1)(F)]

This criterion requires that the Project not impose any undue adverse impact on shorelines.

Shorelines are defined for purposes of Section 248 as the land adjacent to the waters of lakes, ponds, reservoirs, and rivers. Shorelines include the land between the mean high water mark and the low water mark of such waters (Argentine, 1998). As defined and presented in Section 10.0 of **Exh. Pet.-JAN-2**, there are no such water bodies within the Wind Farm component of the Project and therefore no activities associated with development of this component will be proposed that will have adverse effect or encroach upon shorelines

The Transmission component crosses areas that may be considered shorelines. This includes land adjacent to the East Branch of the Missisquoi River, LeClair Brook, Missisquoi River, Taft Branch, Mill Brook, Coburn Brook, Jay Branch, and Crook Brook. However, no undue adverse permanent impacts are anticipated as a result of the transmission line upgrade associated with the Project, particularly because the Transmission component is largely located within an existing utility or roadway ROW. For these reasons, there will be no undue or adverse impacts to shorelines as a result of the Project specified in 10 V.S.A. § 6086(a)(1)(F).

Wetlands

[10 V.S.A. §6086(a)(1)(G)]

This criterion requires that the Project not create any undue adverse effect on significant wetlands. The wetlands criterion for an Act 250 Permit, as incorporated into Section 248, requires that the proposed project comply with the VWR. The VWR regulates significant wetlands (Class One and Class Two wetlands) and their buffers. As with the stream criterion under Section 1(E) above, VHBP has delineated all surface waters, including wetlands within the vicinity of the Project components. For the Wind Farm component of the Project, all delineated wetlands within these areas are Class Three and the Project is therefore not currently subject to regulation under the VWR. For the transmission component, the overall route has been selected for the necessary upgrades. This work will generally involve reconstruction along the existing VEC transmission corridor, or relocation of the transmission line to roadside locations where appropriate, as described further by Mr. Pughe. Although the specific temporary access routes for pole placement, and detailed designs for the Transmission project component have yet to be determined, it is anticipated that construction of the Transmission component will encroach upon several Class Two wetlands and buffers on a temporary basis. In order to mitigate against undue adverse effects to these Class Two wetlands and buffers, temporary access routes will be chosen to minimize wetland and buffer impact. The Transmission component will largely remain within the existing cleared ROWs, so as to minimize clearing of forested wetland and buffer and reduce effects of temporary soil impacts from equipment access. This may include, for example, conducting work during the winter under frozen ground conditions, or using a dry soil evaluation procedure with swamp mats deployed as necessary during construction. For those unavoidable encroachments and impacts to existing forested and scrub-shrub Class Two

wetlands or buffers, an application will be made to the Vermont DEC for a Conditional Use Determination (CUD) permit under Title 10 V.S.A. Chapter 37, Section 905.

Further, it is expected that the Project will be required to obtain a Department of the Army Section 404 Permit and Vermont Section 401 Water Quality Certification prior to undertaking activities with permanent or temporary Class Two or Class Three wetland impacts. Therefore, the design and implementation measures taken, in combination with the permitting review and conditional requirements included with the CUD and Section 404/401 permitting, will ensure that undue adverse effects to significant Vermont wetlands are avoided.

Sufficiency of Water and Burden on Existing Water Supply
[10 V.S.A. §6086(a)(2) and (3)]

In order to demonstrate that the project has sufficient water available for its needs and that the Project will not cause an unreasonable burden on an existing water supply, VHBP has evaluated proposed water use, and also characteristics of existing water sources in the Project vicinity. The Wind Farm component will involve minimal use of water, during both the construction and operational phases. During construction, the contractor will provide any water use necessary for dust suppression purposes from a suitable off-site location using tanker trucks. For the operational phase, a drilled bedrock well to serve the maintenance building will be sited, and permitted in accordance with *Vermont Wastewater System and Potable Water Supply Rules* (VT ANR, DEC, 2007). The design water demand for the Project will be 60 gallons per day, equal to 0.08 gallons per minute (gpm), for four (4) permanent employees, based on 15 gallons per employee per day, in accordance with the design flow standards in Section 1-808 of the Rules.

Based on the well completion reports for the 38 drilled bedrock wells within one mile of the Project on file with the Vermont DEC, the average well yield is 11 gpm and the average well depth is 261 feet, indicating that there is a 99 percent probability of drilling a bedrock well that yields at least 0.08 gpm. Therefore, the Project will have sufficient water available for its needs.

The Project well is not expected to cause any interference or loss of yield to any existing well, due to the significant distance from existing water supplies and the very small amount of water that the Project well will produced.

Blasting necessary for construction of Project roads and other infrastructure is not expected to have any impact on existing water supplies. Blasting in bedrock does not affect rock fractures or the integrity of wells beyond 50 to 200 feet. The bedrock well nearest to the Project site is located approximately 650 feet west of the Project access road along VT Route 100. Mr. Jewkes sponsors a Project-specific construction-phase blasting plan that will be followed by Project contractors. This plan is intended to ensure that explosives are properly managed so that off-site blast impacts to existing water supplies will be avoided.

The Wind Farm component is not located within a wellhead protection area for any public water supply well, and therefore, will not have any effect on public water sources. The Transmission component will not involve blasting and will not require a long-term source of water, and therefore, will not affect local public or private water supplies. Therefore, given the analyses

1 performed we conclude that the Project has sufficient water available for its needs and that the
2 Project will not cause an unreasonable burden on existing water supplies.

3
4 **Soil Erosion**

5 [10 V.S.A. §6086(a)(4)]
6

7 In order to satisfy the soil erosion criterion for Section 248 review, a project must not cause
8 unreasonable soil erosion or cause significant drainage or runoff problems. In order to avoid an
9 unreasonable reduction in the capacity of the land to hold water, a project must not cause
10 unreasonable soil erosion or cause significant drainage or runoff problems.

11
12 The effects of soil erosion on adjacent water bodies and wetlands will be managed in accordance
13 with the Project's specific EPSC Plan, which will be developed in accordance with the *Vermont*
14 *Standards and Specifications for Erosion Prevention and Sediment Control* (VT ANR, DEC
15 2006). The plan will include the installation of preventative measures, monitoring and
16 maintenance of the measures, inspections, and proactive action taken to properly manage
17 stormwater runoff during the construction of the Project.

18
19 Under the NPDES program and the Clean Water Act, construction projects that involve one (1)
20 or more acres of land disturbance require a permit for the discharge of stormwater runoff
21 associated with these construction activities. In Vermont, the NPDES program is administered
22 by the Vermont DEC, which has adopted a risk-based permitting approach. Construction
23 projects that pose a low or moderate risk, with regard to the potential for construction site
24 discharges, are required to obtain authorization to discharge from the DEC under the

1 Construction General Permit (CGP) 3-9020 (2006, revised February 2008). For projects that do
2 not qualify for coverage under the CGP, an Individual Discharge Permit for Stormwater Runoff
3 from Construction Sites (“Individual Permit”) is required. For the Project, it is anticipated that
4 an Individual NPDES Permit will be required. The application materials will include the DEC
5 Risk Evaluation, site soils map, EPSC Plans and Narrative, DEC EPSC plan summary forms,
6 discharge point identification and assessment, and permit application form.

7
8 As a component of the Individual Permit application process, a project-specific EPSC Plans will
9 be prepared utilizing Best Management Practices (BMPs) selected and designed in compliance
10 with *The Vermont Standards and Specifications for Erosion Prevention and Sediment Control*
11 (VT DEC 2006, amended). As part of EPSC Plan preparation and implementation, particular
12 attention will be given to: (1) minimizing disturbance, (2) managing runoff, (3) stabilizing
13 promptly, and (4) monitoring, maintaining, and, if necessary, adapting EPSC measures to
14 evolving site conditions. Minimizing disturbance will involve, to the extent practicable,
15 maintaining existing topography, phasing major disturbance activities, and maintaining existing
16 vegetation. With regard to managing runoff and stabilizing promptly, actions will be taken to
17 (for example): divert potential run-on, stabilize flow paths, disperse concentrated flows through
18 EPSC measures, and stabilize areas of disturbed soil within a specified time frame. With regard
19 to phasing major disturbance activities, the general approach will involve (for example) the
20 following sequence of activities:

21

- 1 1. Installation of specified EPSC measures (e.g., limits of disturbance barrier tape
2 and fence, stabilized construction entrance, silt fence, sediment basins, sediment
3 traps) prior to disturbance of any work area
- 4 2. Clearing of vegetation with earth disturbance (e.g., removal of stumps) in areas
5 where structures (i.e., turbines, substation, Operations & Maintenance (O&M)
6 building, stormwater management systems, pole structures) will be necessary, in
7 anticipation of installation/construction of these structures
- 8 3. Construction of access roads, crane paths, lay down/staging areas, permanent
9 stormwater management systems (likely to be utilized as temporary stormwater
10 management systems during construction), turbine foundations, crane pads,
11 substation, and O&M building
- 12 4. Installation of turbines, as well as overhead and underground electrical collection
13 lines and transmission lines

14

15 The Wind Farm and Transmission components will, in general, be segmented into specific work
16 areas, with limited disturbance occurring in sequence within those work areas, as required by the
17 approved Individual Permit. Work areas will generally be defined by associated EPSC BMP
18 measures (e.g., sediment basins) and their contributing drainage area, thereby maximizing
19 potential for treatment and control of construction-related stormwater runoff. Sediment basins
20 and associated conveyance systems (e.g., drainage swales) are intended to be installed
21 simultaneously with earthwork associated with construction of roads, substation, and turbine
22 pads. As earthwork is completed, the area will be stabilized by means of gravel, seed/mulch,
23 etc., in order to limit unstabilized soils which would be subject to potential erosion, as required
24 by the approved Individual Permit. The areas will then be cleaned up and permanently
25 stabilized. Construction activities and EPSC measures will be inspected at least as often as
26 required by the Individual Permit.

For these reasons, the Project will not cause unreasonable soil erosion or cause significant drainage or runoff problems.

**Rare and Irreplaceable Natural Areas (RINA) and Necessary
Wildlife Habitat and Endangered Species**
(10 V.S.A § 6086(a)(8), (a)(8)(A))

In order to meet these criteria, a project must not have undue adverse impacts upon rare and irreplaceable natural areas (RINAs), or destroy or significantly imperil necessary wildlife habitat or any endangered species. As described in Section 14.0 of **Exh. Pet.-JAN-2**, VHBP has coordinated with personnel from the Non-game and Natural Heritage Program (“NNHP”) regarding known elemental occurrences of rare, threatened, and endangered (“RTE”) plants, as well as necessary wildlife habitat. A field survey conducted by VHBP for occurrences of RTE plants revealed one occurrence of a state protected plant Male Fern (*Dryopteris filix-mas*) within the wind farm component. Since the RTE plant survey results were known early in the design phase of the Project, the Project has been designed to avoid impacts to the Male Fern.

Currently, only one occurrence of a state-listed plant is within or nearby to the transmission route (per 2010 NNHP database information). The Transmission component is generally located within the existing ROWs which are regularly maintained in order to ensure reliable electric service to the public. Construction and operation activities associated with the transmission of KCW-generated power are not dissimilar from those activities associated with normal line maintenance and will therefore not result in undue adverse impacts to any rare plant populations occurring within these regularly-maintained ROWs. As described in more detail below, VHBP

1 will conduct follow-up surveys within those new ROW or expanded forested clearing zones that
 2 will target any as yet unknown listed plants with potential occurrence in the region, and Project
 3 design will incorporate the necessary flexibility to avoid or minimize impact to such species.
 4 Vermont Fish and Wildlife has identified areas of Montane Spruce-fir Forest (MSFF) community
 5 (S3 rank) along the Lowell Mountain ridgeline. Although these areas are not considered RINAs,
 6 either alone or in combination with other natural communities found at the site, efforts have been
 7 made to avoid impacts to the MSFF areas wherever feasible, given their uncommon status.
 8 VHBP has conducted a field survey to map the discrete areas of MSFF within the Project site,
 9 and the Project has been designed to avoid direct encroachments to these areas to the extent
 10 practicable. In addition, through implementation of the EPSC measures during construction,
 11 including limits of disturbance demarcation, intrusion into such areas will be avoided or effects
 12 minimized when encroachment within or adjacent to such stands are necessary. The natural
 13 areas and listed plant species associated with the Project are further described in Section 14.0 of
 14 **Exh. Pet.-JAN-2**. In addition, Mr. Wallin provides a detailed analysis of necessary wildlife
 15 habitat associated with the Project. Based on the analyses that have been performed and the
 16 appropriate mitigation measures that will be undertaken, the Wind Farm component of the
 17 Project will not result in an undue adverse impact to RINAs, or destroy or significantly imperil
 18 necessary wildlife habitat or endangered plant species.

19
 20 Due to the timing of field natural resource surveys of the Transmission component of the Project
 21 (Fall 2009), detailed surveys of RTE plant species could not be performed, since such work must
 22 be conducted earlier in the growing season. However, VHBP has reviewed the relevant

1 databases, and there is only one area along the transmission line with a known presence of a
2 Vermont-listed threatened or endangered plant species. This area, near the Lowell/Westfield
3 town line, will be subject to follow-up field investigation during Spring/Summer 2010 to
4 determine actual locations of these plants and ensure that Project-related activities will avoid
5 impacts on this species. During these follow-up surveys, VHBP will conduct surveys of other
6 areas that may be cleared or otherwise disturbed (outside of the normal overhead or road ROW
7 maintenance) by Project activities, to evaluate the potential occurrence of Vermont-listed
8 threatened or endangered species pursuant to 10 V.S.A. Chapter 123. A five-mile radius review
9 of the NNHP database reveals that two Vermont-listed plants are known in this area of the
10 Transmission component. Follow-up surveys during Spring 2010 will target areas of potentially
11 suitable habitat for these species. The Transmission component will be designed to incorporate
12 suitable flexibility in order to avoid impacts to any as yet unknown occurrences of Vermont-
13 listed plant species that may be found in these surveys.

14
15 VHBP did not survey the transmission component for RINAs, because this area is within
16 existing overhead utility or roadway ROWs that are subject to regular maintenance. However,
17 from review of the NNHP databases, only one known significant natural community location
18 occurs within this Project component. This natural community is associated with the Vermont-
19 listed plant species described above. Concurrent with follow-up plant surveys, the extent of this
20 community within the Project site and survey portions of the project that may be cleared or
21 otherwise disturbed (outside of the normal ongoing VEC overhead electric line or roadway ROW

1 maintenance) for this community type will be mapped. The Project will be designed to avoid
2 undue adverse impacts to the known significant community and others that may be discovered.

3
4 Mr. Wallin again provides a detailed analysis of necessary wildlife habitat associated with this
5 component of the Project. Based on the analyses that have been performed, the scope of
6 subsequent field surveys to be conducted, and incorporated design flexibility, the Transmission
7 component of the Project will be designed and implemented so as not to have an undue adverse
8 impact to RINAs, or destroy or significantly imperil necessary wildlife habitat or endangered
9 plant species.

10
11 **8. Q. Could you please comment on the “variable road location detail” as it relates**
12 **to your testimony above?**

13 **A.** Yes. I have considered the “variable road location detail” described by Mr.
14 Jewkes. Since this detail provides for the protection of natural resource features, including
15 buffers, enables more rapid construction and stabilization, and reduces the overall area of earth
16 disturbance, I do not believe that the use of this approach for construction of the Project access
17 road or crane paths will significantly change impacts to natural resources. A key component of
18 this approach is that areas within the cleared corridor which are not needed for access road or
19 crane path grading will not be stumped or grubbed. This results in several benefits. First,
20 potential for erosion will be minimized since little or no soil disturbance will occur within these
21 areas. Second, these areas will be allowed to regrow with native vegetation. The preservation of
22 the existing topsoil, stumps and root masses along with the additional sunlight associated with

1 access road or crane path clearing will enable this regrowth to occur within a relatively short
2 period of time.

3
4 **9. Q. Does the Project require any collateral permits relating to the criteria you**
5 **address above?**

6 **A.** Yes, as noted above, the Project will require the issuance by Vermont DEC of
7 construction phase and operational phase stormwater discharge authorizations. A Section 404
8 permit from the USACE and a supporting Section 401 Water Quality Certification from DEC
9 will also be required. It is likely that a State of Vermont CUD will be required, due to potential
10 impacts to Class Two wetlands and/or buffer zones along the transmission corridor. Finally, a
11 Wastewater System and Potable Water Supply Permit will be necessary for attendant
12 maintenance and operations facilities at the Wind Farm site. This permit is expected to be issued
13 prior to the commencement of construction of this building.

14
15 **10. Q. Does this conclude your testimony?**

16 **A.** Yes it does.

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